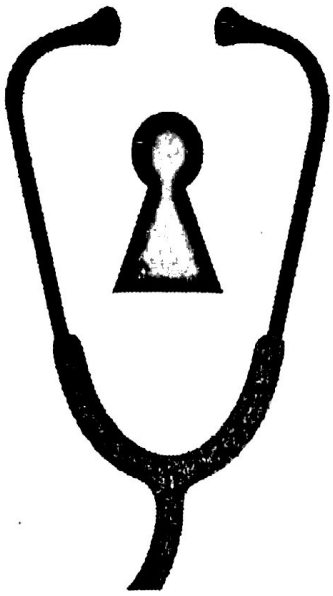
MED GATE

Nutrition



فقط وحصرياً لدينا

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Water soluble vitamins

Q.Function, deficiency symptom &sources of thiamine & B12 in animal ?????

	(1) Thiamin (B1):	(2) vit B12 (cyanocobal amin): (APF)→Animal protein factor
Function	Formation of coenzyme:- 1) amin pyrophosphate (TPP) 2) 2. Lipothiamide (LTTP) ➢ Which play a role in pyruvate & glucose metabolism	1) It is a coenzyme in several important enzyme 2) 2-In metabolism of propionic acid 3) 3-syntheis of purine , pyrimidine → essential component of N.A
Deficiency	**1) beriberi "I can't I - can't ":** • due to poor metabolism of glucose • enlargement of heart, heart edema, weakness, edema of the feet & leg **2) In rat & chicks:** • Polyneuritis → walking in circles, Arched back	**1) very rare in ruminants :** • because rumen micro flora capable of synthesize vit B12 **2) In poultry:** • poor feathering , kidney damage and unhatchability of hens **3) In pig :** • poor growth • in coordination of hind leg
Sources		➢ Widely distribution in fish, animal tissue, m.o of rumen
		❖ **Relationship bet vit B12 and folic acid :** 1) Folic acid and vit B12 → synthesis and metabolism of various compounds for N.A , methionine , choline 2) Vit B12 → necessary for storage of folic acid in liver 3) Vit B12 → enhance the conversation of methyletetra hydrofolic acid (in active) to →THFA (active form) So vit B12 deficiency may induce folic acid deficiency

Riboflavin (B2)

Fun:-

- Coenzyme →FAD, FMN
  - Which participate in many energy-yeilding metabolic pathway

Deficiency signs:

1) in all animals → general dermatitis
2) Dermatitis in human → Eye , Angular stomatitis, Glossitis of tongue, Scrotal dermatitis
3) in poultry → poultry curled toe paralysis
4) in rat → eye cataract, conjunctivitis
5) in dog → fatty infiltration in liver

Sources:-

1) Leafy forages
2) Yeast

Inhibitors:-

1) Isoriboflavin
2) Glactoflavin
3) Chropromazine
4) Phenothiazine

Q. Mention cause / vit lead to abnormal feathering???

Pyridoxine, vit B12, folacin

Q. Mention causes / vit lead to dermatitis???

Riboflavin, Pantothenic acid, niacin, biotin

Q. Mention causes / vit lead to fatty liver???

Riboflavin, Pantothenic acid, inositol

Q. Factors affecting maintenance requirement??? (إمتحان)

(1) Exercise:-

- ↑↑Exercise → ↑↑ maintenance requirement

(2) Weather (Temp, humidity, air movements)

a) **Temperature :-**

- **Comfort zone**: - at which animal perform little or no work to maintain temp constant.
- If temp ↑↑ than comfort zone → ↑ nutrient need to keep animal cool
- If temp ↓↓ than comfort zone → ↑ nutrient need converted to heat to keep body warm
- **Comfort zone vary acc. To:-**
  1) Spp. Differences:-Result from kinds of thermo regulatory mechanism provided by nature as type of coat (hair, wool, feather, sweat gland.
  2) 2- Age:- - comfort zone → narrow for young lamb (24 _27)
     - comfort zone → wide for old sheep
  3) 3- breed:-It is possible to select animal well adapted to specific environment.
     E.X sheared sheep (have no wool) are adapted to desert

b) **air movements:-**

- in warm weather → air movement make more comfort
- in cold weather → it add to stress of low temp
- in hot weather → the nutrient requirement ↑ when the wind velocity ↑

(3)body size:- (w0.75)

- Smaller animal has higher rate of metabolism per kg of body weight than larger animal

(4) Heat:-

- Disease & parasites reduce feed efficiency with great economic loss
- Illness → ↑ nutrient requirement

(5) Temperament

- Natural or induced nervous animal need nutrient req. then calm animal

(6) Individual variation.

- Easy keeper animal its feed efficiency more than hard keeper

(7) Level of production

- Higher rate of production have higher maintenance req. than lower production rate

(8) Lactation:-

- Maintenance req. for lactating females of all spp. is higher than those of dry, non lactating

(9) Stress

- Any stress (fatigue, prescience of strangers) → ↑ maintenance requirement

Q. Effect of prolonged malnutrition on breading animals(reproduction)??? 2008,2009,10,11,12

Malnutrition means:-

1) Under nutrition [sub- maintenance].
2) Over nutrition [above maintenance].
3) Deficiency of certain nutrient or imbalance bet some nutrient

1- Effect of under nutrition.

- In male → reduction of spermatozoa output or smaller output of the secretion of the accessory gland.
  - E-X: - in bull kept on very poor diet [lose 0.9 kg body weight day] was able to produce semen contain normal sperms.
- In females → lead to stop ovarian functions.

2- Effect of over – feeding:-

- Very fattened animals are sterile.
- Some fatty females may continue to produce ova but fail to show signs of estrus as estrogen is melt in fat which is responsible for oestrus.
- Fatness cause parturition to be difficult due to narrowing of birth way.

3- Effect of specific nutrients deficiencies on the production of ova & spermatozoa.

A- Deficiency of protein:-

- In experimental animals cause reproductive failure, **however** In farm animals depress the appetite.

B- Minerals & vitamins:

- In general the reproductive fun. are more **resistant** to those deficiencies than other body functions as reproduction has priority on some other body activities.

- **E-X. 1**
  - Blinded animals due to **vit. A deficiency** → may still able to produce sperm.

However,

- Prolonged deficiency of vit A cause: - 1) testicular degeneration and
  2) Keratinization of the vagina followed by
  3) Irregular oestrus or abortion at advanced stage of the term.

"

- **E-X [2]**
  - ↓↓**Vit E** causes sterility in rats **but** not in farm animal.
  - If female of sheep or cattle were fed diet deficient in vit E, the offspring of both are born weak and have white muscle disease.
  - In foals too vit E deficiency cause sterility in males and reproductive failure.

- E-X [3]
  - **Deficiency of phosphorus** will cause reproductive failure or in fertility in female's animals than ca does.
  - Phosphorus deficiency in female cause cessation or absence of oestrus.
  - Phosphorus deficiency arises in ruminant grazing on forages low in phosphorus.
- E-X [4]
  - **Mn deficiency** cause:-
    1) Delayed sexual maturity.
    2) Delayed or irregular oestrus
    3) Impaired ovulation.
    4) Reduced fertility.
    5) Reabsorption of fetus or abortion.
    6) Weak offspring or died offspring.

- E-X [5]
  - Iodine is known to cause reproductive failure

Q. effect of nutrition on initiation and maintenance of reproductive ability???

- **In general** → the faster an animal grows, the earlier will reach sex maturity.
- **In cattle**
  - Puberty occur at particular live weight rather than at a fixed age.
  - Heifers used for breading at 7 month **but** they are not mated until they are at least 13-15 months old.

- **Feeding of male animals:-**
  - In mammals, the spermatozoa and the associated secretion represent only a small amount of nutrient.
  - The average ejaculate of a bull for example contains only **0.5 gm** of dry matter. So, the nutrient req. for an animal kept for sperm production is **very small** compared to those required for growth or location.
  - There is **no** evidence that high plane of nutrient are beneficial for male fertility.

Q. Nutrient requirement of board mare?

1. Open mare (non pregnant)
2. Pregnant mare
3. Lactated

1) Open mare:-

- Open mare are considered to have maintenance nutrient req. +feeding
  - Maintenance nutrient req :-
    - DM intake →2- 2.5% of bwt
    - CP →7- 8%
    - TDN→ 45- 50%
  - Feeding:-
    - Good quality hay or forage (1.5 - 2% of bwt with 0.5% salt or free choice
    - or 0% concentrate and 100% roughage)
    - 0.5%of bwt can be supplied in form of concentrate (grain)
- Open mare should be placed on an increased plane of nutrition (4-5 weeks) before and during breading season Make
- Flushing concentrate (0.5 – 1Lb/100kg BW) to stimulate ovarian activity

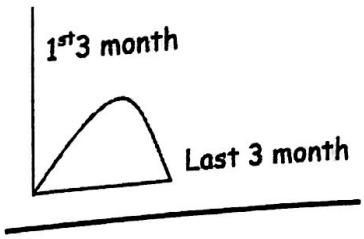
2) Pregnant mare:-

- First 8 months of gestation nutrient req. of mare are slightly above the maintenance (0.25%) than maintenance
- During last 3 months of gestation (60%) of weight of foal accumulated (30_50% than maintenance).
- Forage (1_2%) BWT
- Grain (1.5_2%) BWT
- (20_30%) concentrate & the rest is hay
- Requirement:-
  - CP → 10- 10.6%
  - DE → 2.25-2.4 Mcal kg.

N.B

- Failure to provide adequate level of nutrient during last gestation reduces foal size and loss of mare's tissue.

3) Lactated:-



1st 3 month	Last 3 month
↑↑lactation • Cp →12.5 -14% • TDN → 55 - 60% • DM → 3% BTW Feeding:- • Concentrate 45_55% • The rest →roughage	↓↓Milk production • Cp →11.12.5% • TDN →45 - 50% • DM →2-2.5 % BWT Feeding ➢ Concentrate 30_40% ➢ The rest roughage Last 3 month

Q. Principal Feeding of foal till yearling???

1) Colostrum: -

- The first milk and it is important because:-
  1) It contain **antibodies** for the first 24_36 h of the foal's life ,intestinal tract is permeable to these antibodies so easy absorbed into the body
  2) It contains high **vitamins** and other nutrient {one time sucking of colostrum contains (100–1000) times of vit A which present in milk.}
  3) It is **laxative** substance promote cleaning the G. T from fecal matters
- After colostrums, foal suck whole milk 10% from Bwt up to 6 months.
- Lack of colostrum can be replaced by :
  1. One whipped egg.
  2. One tea spoonful of olive oil.
  3. One liter of mare or cow milk.
- In first year, foal gain 75% of mature weight (3lb\ day or 1.4 kg\day).
- Yearling foal gain (0.5-1.5 lb\day or 0.25-0.7 kg\day).

2) Orphan foal:

- Its dam died during its parturition.
- Sickness of mare.
- Mare is very poor milker.
- Its dam refuses sucking its offspring.
- Some horse gets twins.

feeding orphan foal :-

- Fed frozen colostrum (mare colostrum).
- Shift to another dam.
- Feed on cow milk after modification

	water	protein	fat	Lactose	ca	p
Cow's milk	78.2	3 - 6	3 - 9	4 - 9	0.09	0.05
Mare's milk	90.8	2 - 2	1 - 5	5 - 9	0.9	0.04

Component of cow's milk replacer:-

- 0.47 liter of cow milk + table spoonful of sugar + 3.5 table spoonful of lime water → give 100ml\hr _ 3 liter \ day.
- Weaning at 3 months

3) Feeding of weanlings	4) Feeding of yearling horse
• From weaning to reach year → (1-5 Lb grain + 1.5 Lb hay for → 100Lb of B.w)	In this period build up body muscles If the yearling **thin** give :- o ↑Grain o hay
TDN → 75 % Cp → 16 % Ca →0 .55 % P →0 .3 % Lysine →0 .55 %	• Yearling that not trained → need **less** grain & ↑ forage • but A in training need greet ↑concentrate
Concentrated mixture:- •Green corn → 37 % •Barely → 23% •Lime stone 2 % •Salt →1 % •Vit & premix → 0.5 % •Brewer's yeast → 0.5 % •Molase → 0.3 %	**Feeding 2 – 3 years:** •↓Conc. and ↑forage •Need → maintenance req. + exercise req + work req.

Q.Minerals & vit req for working horse????

a) Minerals

- **Ca,p,etc**
  - Play role in energy metabolism
  - In working horse → ↑ basal metabolic rate →↑ respiration → ↑requirement of energy **so** →↑ minerals req
- **Na , CL , k**
  - Essential for regulation entrance of nutrient inside of the cell & in osmotic pressure
  - ↑Na , CL req.→ due to loss in sweating
  - ↑K req. during work as→ fix O_2 in the cell & act against stress

b) Vitamins

1. **Fat soluable vit.**
   - Vit A,D,K→ its req. are the same for work & maintenance
   - Vit E→↑ 2-3 times more than maintenance as it ↑integrity of cell membrane
2. **Water soluble vitamins**
   - **Vit B complex** →↑ 3-6 time &than maintenance as it play role in energy metabolism
   - **Vit c**
     - ↑2-3 times than maintenance as→ it importance for health of Bl Vs. of nostril
     - Important for racing horse that are nasal bleeding

Q. General roles for feeding horses???

- Horses need good quality protein as legume hay & soybean meal & linseed meal
- Don't feed grains one hour before ,within or after work
- Feed horse individually
- Daily exercise improve appetite , digestion ,feed utilization
- Make sure that horse teeth are sound
- Cheek feces color, odor , amount
- Know approximate weight & age of each horse
- Inspect feed box to know overfeed , horse sick
- Don't over feed ,remember that the Arab proverb that (the two greatest enemies of horses are fat& rest)

Q. Nutrition diseases of horses ??

1) Azoturia (myoglobin urea or Monday morning disease)

Causes:-

- Hard working draft horse were full-feed grain on their day off from work lead to store in form of glycogen in muscle → anaerobic oxidation → lactic acid → break muscle fiber → myglobin → blood → urine "coffy urine"

Symptom:-

- Camp - Inability to move - Tying up
- Profuse sweating - Rapid respiration

Treatment

- Complete rest
- Fluid therapy "saline"& anti-inflammatory drug
- Vit E & selenium (prevent oxidation of M fiber)
- Hot toweling of affected Mm fiber

Prevention

- Give animal maintenance req.
- 10 min training , light exercise before working after day rest
- Half of gain req.

	2) Founder(laminitis)	3) Colic
Def	• Inflammation of sensitive laminae & general hoof inflammation	• Abdominal pain caused by distention of stomach & intestine
Cause	1) Excessive consumption of lush grass or grain 2) Retained placenta with inflammation **What is happen??** 1) In retained placenta , ↑ bact. Toxin is primary cause 2) Sudden consumption of excessive amount of grain → lead to escaping grain to hind gut "cecum" → fermentation → lactic acid → blood circulation of laminae of hoof → inflammation due to growth of Mo → toxins	1) Excessive consumption of lush grass or grain 2) Sudden change in ration lead to colic impaction 3) Sand colic due to roughage contain high amount of sand
Sympt om	1) Restlessness 2) Go in fire 3) Profuse sweating 4) ↑↑respiration	1) Restlessness 2) Looking to flank region 3) Rolling on ground 4) Accumulation of grasses 5) Kicking to flank region & ground
TTT	1) Complete rest , Fluid therapy 2) Bedding from straw or sand 3) No exersice , no working 4) Antihistaminic & anti inflammatory	1) Analgesic 2) Paraffin oil , mineral oil 3) Rest to animal
Preven tion	• Avoid high intake of grian	1) Avoid ,,,,amoint of grain 2) Avoid sand in roughage 3) Avoid sudden change in roughage

Q. Immediate sourse of cellular energy for working horse?2011

1) Fatty acid =>low intensity &long term
2) Glucose =>high intensity & short term
3) Glycogen =>high intensity & long term

Q. Sources of milk constituent & milk synthesis????

Milk protein:-

- True protein 95% (casein 78%, B- lactoalbumin , lactoglobuline) .
- NPNC 5% {urea, creatine and ammonia} which fiterated directly from the blood.
- Dietary protein, bacterial protein and tissue catabolism a.a blood mammary gland milk p protein synthesis

Milk sugar (lactose):-

- Lactose glucose + galactose.
- Blood glucose mammary gland enzymes glucose changed into galactose then both form lactose.

Milk fat:

- Milk fat triglyceride F.a + glycerol.
- F.a saturated 4-20 carbon atoms.
- Unsaturated oleic, linolei and linolenic.

Nutrient requirement for lactation

❖ **In ruminants:**

- Blood acetate and B- hydroxybutrate fatty acids up to C14 and some of C16
- Plasma lipid most of C16 & higher acids.

❖ **In non-ruminant:-**

- Blood glucose and acetate fat up to c18.
- Plasma lipid higher f.a.
- Glucose doesn't serve as an f.a precursor in ruminant but it is essential for f.a synthesis in non-ruminant.

Glycerol:-

- Blood glucose plasma glycerol mammary gland glycerol

Minerals:-

- 25 minerals are present in minor and major element
- Minerals from water and feed blood selective absorption by mammary gland secreted in milk

The gland able to:-

1) Block entry of some elements (fluorine & se)
2) Allow passing of others (zn & mo)
3) Selective absorption of (fe &cu) important for hemoglobin formation and in nutrition of young animals however they cannot increased in milk by feeding the lactating animals high level of them.

Milk vitamins:-

- Milk has considerable amount of vit.a due to presence of vit.a and carotene in blood and body stores
- Vit. C & D → very small
- Vit. E & k → traces
- Vit b → wide rang

Q.Effect of limitation of feed intake & feed FEED constituent on milk production & milk composition???

- Deprivation of dairy cow from feed course **drop** of milk production to about 0.5 kg by third day will ↑ total solid of milk
- In general, lactation cow tend to produce milk of constant composition
- Any inadequacy in the ration or fault in the method of care & feeding → manifest by reduction in milk yield rather than change its chemical composition
- **Effect of energy:-**
  - Low fiber may decrease the milk fat %
  - ↓Energy→ affect milk yield ,not affect composition
- **Effect of protein**
  - Milk contain 3-4% protein→ 95% true proteins 5% NPNC
  - ↑Protein→↑NPNC
  - ↓Protein→↓ milk production
  - Deficient **or** excess of protein in diet **not** change the composition of milk **but** ↓ the yield
- **Effect of fat**
  - Low fat may→↓↓milk yield
  - **↑Fat irritation**:-
    - ↑Milk fat for few days(3-5 days) then return to normal level
  - **Palm oil**

- Rich in un saturated fatty acid
- Cause very small in milk fat for long time

➢ **Fish oil (cod liver oil)**

- ↓Milk yield & milk fat

➢ **↑Fat**

- Affect C.C.C of milk fat
- Cotton seed oil →hard butter
- Soya bean oil →soft butter

Effect of diet on milk composition

➢ **Effect of lactose**

- Lactose in milk **not** changed by ordinary method

➢ **Effect of minerals**

- Ca&p→ constant in milk
- If Ca&p↓↓↓ in ration→ ↑milk production
- ↑Zn,Mo,Ca in ration→ ↑ in milk
- Iron→ **not** pass through barrier of mammary gland so it is low in milk constant

➢ **Effect of vitamin**

- **Vit A & carotene** →↑in milk with increasing in diet
- **Vit E & D** constant
- **↑Vit B complex in diet**→ ↑ in milk

Feeding of dairy cow لازم تيجى فى الامتحان

The production cycle are derived into 4 period

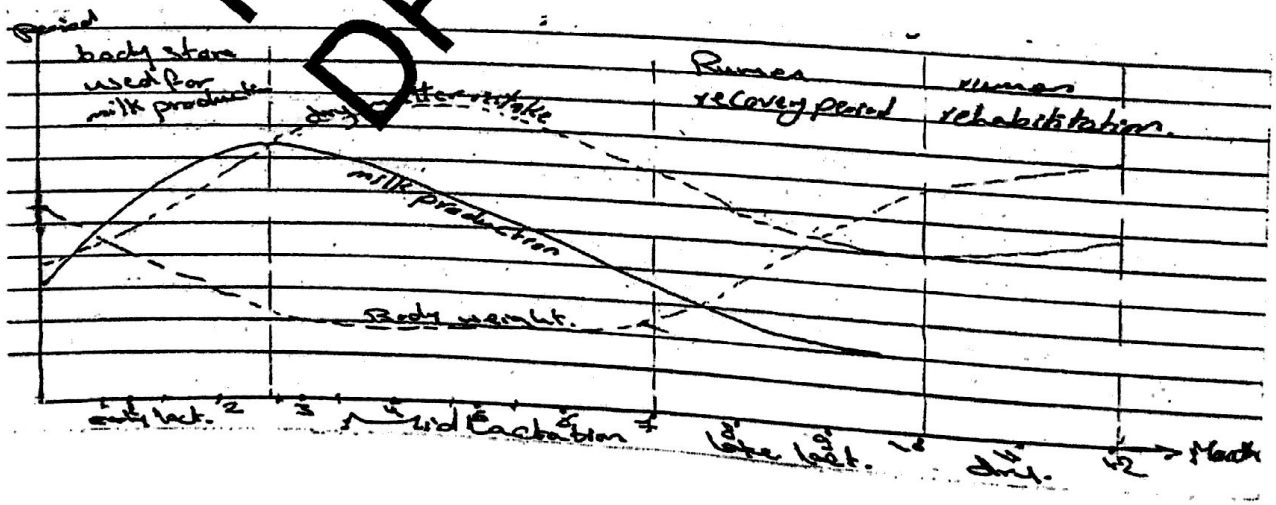
1. Early lactation
2. Mid lactation
3. Late lactation
4. Dry period

curve فى الامتحان لازم ترسم ال

- At time of calving→ 1st given the calf the colostrum immediately with providing warm water & warm grain to cow

1-Early lactation phase I (0-90 days)	2. mid lactation phase II (91 – 210 days)
•Most critical time •DM intake 2.5 – 2.75% of B.wt •The maximum DM intake → 3-3.5% which **not** achieved till 100 days after calving •↑↑Milk producing till peak • So good dairy cow low B.wt in early lactation & mobilize enough energy from body stores. •Cow feed high quality forage o Concentrate: roughage 60% : 40% o Addition of Na bicarbonate act as **buffer** to prevent **acidosis** •Dairy cow →need 16 – 18 % protein •Energy intake should ↑3 -4 time than of maintenance •Protein intake should↑ 6 -7 time than maintenance.	•DM intake must be maximized quickly as possible to minimize w.t loss→ maintain best reproduction •DM → 3.5 -4% of body weight •Cow enters mid lactation when lactation Peaks is **high**. & begin decline slowly. •lactation curve begin decline at rate of 3 – 5Kg milk each month Great decline indicate in proper nutritional balance or feed intake, serious health problem. Loss of weight ceases & cow begin to regain wt. •excessive CHO in this phase → cow fatten rather than converting nutrient into milk

3-late lactation phase III(211 till end lact.)	4-dry period (Dry phase)
• Called **recovery phase** in which changing the diet to higher proportion of forage & reduce intake of→ highly fermentable CHO lower protein 18% body weight • DM→↓↓ • lactation↓↓ to restore body condition for precaving stage • B.wt→↑↑ the primary feeding aim be control body condition • The cow on normal reproduction cycle will be pregnant	**Feeding dry cow for next generation** •60-40 days required to permit the mammary gland to repair & repair for next lactation •high production cow eat large amount of bran during lactation lead to→ produce more acids in the rumen→ damage cell lining the rumen •High forage diet hay reduce ruminal acidity permitting the cell living rumen(**Rumen rehabilitation period**) •About 14 days prior to calving dry cow begin to feed grain mixture (0.5- 1 kg\100 kg B.wt) •This late dry period shorten the time required to achieve maximum grain intake during early lactation



Cow fed according to their body condition scoring into 4 group

1- **Fattened cow**→ should fed only mixed grass ,legume and hay with **no** grains

2- **Good cows** → feed good quality roughage & forage with minimum grain to balance minerals

3- **Poor cows**

- can be fed on grain (2-3-5 kg grain\ day)
- Good forage to reach a suitable condition score with expectation of low milk yield & some metabolic disease

4- **Emaciated cow**

- Cow which cannot restore the body condition score during the late lactation or in dry period
- however helping for restoring body wt which achieved by feeding grain mix (4\5 kg\d)

The most important points in feeding dry cow:-

- Fed very little feed during drying off specially for high Producers
- Avoid excessive legume & excessive high energy feed
- Have cow in good condition but not over flattened
- Don't challenge feed during dry period
- Ca :p → 1:1 or 2:1
- Feed proper amount of concentrate acc to scoring system
- Balance the ration for protein, min, vit.

Q.Sources of Milk protein "3point" ? 2007

1) Dietry protein
2) Microbial protein
3) Tissue catabolism

Q.Sources of fatty acids in Milk "3" ? 2009,2010,2011

a) **Ruminants**
   1) blood acetate
   2) B-hydroxy butyric acid
   3) Plasma lipid

b) **Non .Ruminants**
   1) Glucose
   2) Acetate
   3) Plasma lipid

Q.Sources of vitamins in Milk "3"? 2009, 2010, 2011

1) Diet
2) Microbial synthesis
3) Tissue synthesis

Q.Ammonia Flavour In Milk is due to ?"3"

1) High protein in diet
2) High degradable protein in diet
3) Urea containing ration with low starch
4) Low sulphur content in diet
5) Low buffer
6) Low trace element in diet
7) Simple in digestion
8) Bacterial inefficiency

Q.To have good cow during last 60 days lactation "dryperiod""4 piont"? 2009

1) Feed every little feed during dry period.
2) Avoid excess legume &energy
3) Avoid excess ca
4) Don't challenge feed

Q.Principles of feeding newly born calf?2009,2010,2011

Colostrum ,Whole Milk ,Grains or Concentrate ,Roughage

Calves

FEEING OF NEWBORN CALVES FROM BIRTH TO WEANING

Principle of feeding the newborn calves:-

1- Feeding colostrum:-

- The calf should receive colstrum as soon s possible for good calf raising program
- This colustrum protect calf against disease especially that of digestive tract
- Calf should give colostrums not more than 1/10 of body B.wt (3-4 kg/d)
- Calf should have enough colostrum from first milking as by 2nd milking as the conc. Of immunoglobulin fall to the half of the first milking, beside the absorbability of antibodies declined shortly after calving.
- Good cow produce 25-30 litre colostrums so the excess should be preserved by one of the following:-
  - It could be kept in a refrigerator in closed tanks for up to 40 days
  - It could be kept frozen for unlimited period
  - It could be preserved by acids or formaldehyde for few weeks
- Preserved colostrum used at the same level as fresh one , if the colostrums not a available from the dam the following substrate for colostrums may help 2 whipped egg in 0.3L→ this mixture for 3-4 time / day

2- Starting the calf on whole milk

- Calf should receive whole milk in normal amount (1/10 B.wt) for at least 2 weeks preferably for 3-4 weeks or more

3- Feeding grain& concentrate

- When calf is 1-2 weeks it should be learned to eat grain specially (wheat bran ,soybean, linseed)
- In the first weeks , a handful of the grain mixture will be sufficient
- In the 2nd month 1/2-1 Lb grain mixture
- In the 3rd month 1-2 Lb grain mixture

4- feeding fine quality roughage:-

- It is very important that calves should have hay in good quality help rumen to develop
- At about 2 weeks of age , some little chopped hay should be placed each day
- Start to provide water for the calf at 4 weeks of age

Time of weaning occur at too early 6-8 week of age (early weaning) **or** 10-12 week of age (later weaning)

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VARIOUS SYSTEMS FOR FEEDING CALVES

1- Raising calves on skimmed milk:-

- If skimmed milk is available →calves should be changed from whole milk to this by-product→ when the calf is 2-4 week old
- The change should made at a rate 1 Lb over period 7 days
- After the calf has changed entirely to skimmed milk the daily allowance may be↑ gradually to 8-10 LL/d but not more than 12-14 Lb of skimmed milk / day (dried milk)

2- Feeding butter milk, whey or reconstituent milk

- Reconstituted milk (1-1.25kg with 10 L warm water)
- Dried milk whey→ good substitute fir skimmed milk
- It is best to change calves from whole milk to butter milk when they are 4 weeks (butter mote laxative than skimmed milk)

3- Raising calves on nursing cow:-

- When dairy by-product not available on the farm→ the use of nurse cow method become evident with more success
- In this method 3-4 calves of about the same age kept in a stall with a cow competing for her milk.
- The calves are learned to eat calf meal & hay as soon as possible weaned at 2-3 months

4- Raising calves on calf starter and minimum whole milk:-

- When skimmed milk, butter milk or dried milk are not available on farm →the calf starter method is widely used
- In this method after the calf start on whole milk & learn to eat calf milk hay at 10 days of age → the amount of milk reduced quickly & calves weaned from milk at 7-8 weeks & continued to feed on calf starter with good hay
- **Calf starter should contain:-**
  - 20% CP,5% fat, 3% fiber + mineral ,vit mixture)
  - The best way to use is:-
    - ✓ 1-2 weeks give whole milk
    - ✓ 3-7 weeks or 10 weeks give minimum amount of whole milk (1/2 usual mount +calf starter)
    - ✓ At 7-10 weeks or 3 months give calf starter + hay
    - ✓ At 3 months give calf starter + grain + hay
    - ✓ At 4 months changed to cheaper concentrate

✓ Calf starter generally contain dried milk , dried skimmed milk or dried whey in addition to soybean meal, corn & wheat bran

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5- Milk replacer

- About 100-125 g of milk replacer should be added to 1 L of warm water then fed the calf as follow:-

  1- (1/10)of B. wt →at 1-3 weeks of age

  (1/15) of B. wt→ at 4-5 weeks of age

  (1/20) of B. wt→ after 35 days of age

  2- contain dried skimmed milk , whey or reconstituted milk to about 30-50 % of total weight

  3- A good milk replacer should contain minimum of (95%TDN 22% cp 10% fat less than 3 % fiber, 0.7 ca , 0.5 p, vitamins & trace minerals

- The compound should make colloidal with water & should be palatable

هام امتحان

Q. MENTION DISEASE CAUSED BY NUTRITIONAL METABOLIC DISORDER DISCUSS ONE OF THEM

Metabolic	Nutritional
Milk fever	Lactic acidosis (founder)
Ketosis	Rumen parakeratosis
Fat cow syndrome	Depraved appetite
Downer cow syndrome	Diarrhea
	Bloat

	Milk fever	Ketosis
Def.	**Def.** not febrile disease of high producing dairy cow occur bet 24 hours before 72 hours after calving	(pregnancy toxemia in sheep)
Causes	→Parathyroid insufficiency in the basic cause of failure to mobilize adequate amount ca to bl →Feeding↑ ca or during dry period → ↑Amount of conc. Diet of dry period → ↑Milk production rate	→ Low bl. Glucose (CHO) → Inadequate nutrition → Multiple fetus (high energy demand by fetuses) → Obesity → Poor body condition
Symptoms	→ Recumbent with head turned laterally → Tongue is protruded out of the mouth → Dribbling of saliva	→Recumbancy →Failure to eat →Coma to death
treatment	→ Injection of Ca with vit. E → Maintain cow in standing position	→ Injection of glucose I/V → Oral glucose (propylene glucal) → Caesarian section
prevention	→ Reduce Ca intake at dry period → Using vit D in high dose	→ Adequate energy in diet → Prober body condition → exercise

Fat cow syndrome	Downer cow syndrome (cow creeping disease)
→ Combination of metabolic, digestive & reproductive disorder affecting over fat cow at near time of calving. **Causes**:- → high conc. intake in dry period. → low milk production with excessive obesity → ↓ dietary CP. **Prognosis** Very very bad.	Used to cows which recumbent &unable to rise &creeps along the ground with both hind legs. **Causes:-** → Complication of milk fever or affected high milk production. → Traumatic injury for medial. Thigh muscle. → Difficult birth due to over size of fetus result in peripelvis traumatic injuries→ malnutrition. **Prognosis**→ very bad. **Symptoms**→ recumbancy. **Treatment:-** → maintain cow in standing position. → provide comfortable bedding. **Prevention**:- → correct feeding during late lactation. → reduce incidence of milk fever.

	Bloat (tympany)	acidosis
cause	↑ feeding of legumes. ↑ feeding of grain.	It is fermenting disorder. Cause: - result from high feeding of concentrate.
symptoms	→ Abdominal distention of flank region. → Abdominal pain.	→ Severe abdominal pain. → Recumbancy. → Staggering gait.
Treatment	-Free gas tympany→ by using trocar&canula. -frothy tympany→ by using liquid paraffin, tympanol.	→ Evacuation of rumen by giving paraffin oil. → Correction of ruminal PH by giving Mg. oxide. → Antihistaminic. → give some stomachic
prevention	→ feeding some dry forage with legumes. → use antifoaming agent with chronic bloaters.	

Q.Milk replacer?2010

- CP-22%
- Fat – 10%
- Fiber _ 3%
- TND_95%
- CA-P_0,7% _ 0,5%
- Vitamin &trace minerals

Q.Animals kept in maintainance ration as?

1) Mature male in non breedhng season
2) Mature female,non pregnant,non lactating,non reproductive
3) Idle horse
4) Rabbit male&female in summer

Fattening calves

Q. Factors affecting growth rate ??

1) **Initial body weight "weaning calf weight":-**
   - Calf of body weight less than mean by more than 10% →should be early fattening & slaughtered.

2) **Breed :-**
   - growth rate of foreign bread of fattening "frasion , brownsuis" (1.4 -1.6 kg/d) is higher than native bread (1-1.25kg)
   - Small size bread →max B. w.t is 400kg.
   - Medium size bread → max B. w.t is 500kg.
   - Large size bread → max B. w.t is 600kg →Holstein , Short horn bread (1.6kg/d)

3) **Size :-**
   - Growth rate of male → higher than female by about 10%.
   - Uncasterated male → higher than castrated by 10% in daily growth rate & mature body weight not affect carcass quality or character.
   - Castrated male → higher than female by about 10% & more efficiency utilized.

	Daily growth rate kg/d.	FCR
Female	1.1	7.5:1
Castrated male	1.28	7:1
Uncastrated male	1.4	6.7:1

4) **Age: -**
   - Young age has higher relative growth rate (RGR) & lower feed conversion ration "FCR" than mature adult age.

Q. Feeding system for fattening animals???

1) Feeding high forage (barseem system)
2) Feeding high concentrate diet.

1) Fattening of calves on forage:-

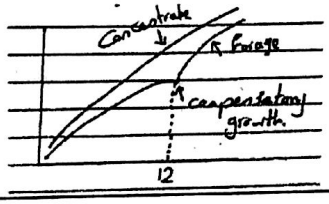
- Calves kept on forage (barseem) till marketing.
- **Advantages:-**
  - This system is suitable for low intensive production "extensive system"
- **Disadvantages:-**
  - need longer period (↑ 2 year) as low growth rate "0.6-0.8 kg"
  - ↑ cost → delay economic return.
  - Produce low quality meat as ↓ fat deposition within M. fiber.
- **Improving this system:-**
  - Animal kept on grass "grazing" to ↓ cost.
  - 30-60 days before marketing → feed concentrate (grain) mixture → ↑ deposition of visible fat.

2) Fattening of calves on high concentrate

First system	Second system
1- Obtain medium growth rate (0.5-0.6kg/d) for long period 12-16M of age. 2- Barseem in winter →b-hay in summer then high conc. 3- Diet for 6-8 Ms to obtain market weight "16%conc→1-1.4kg/d is sufficient **Advantages :** • Suitable for low intensive	➢ High conc. Diet "high plant nutrition" for calves after weaning. ➢ After weaning →3 days adaption for ration (50%R: 50%C). ➢ ↑conc. Gradually→ may reach 70-90% & roughage not less than 10% to maintain rumen motility. ➢ **for foreign breeds:-**

production "extensive system"
- Suitable for berseem season in Egypt
- Produce compensatory growth at late period.

Disadvantages :
- High cost due to delay the economic return "2years"
- Low net carcass "dressing%"→56-58%.
- Produce low quality meat →↑fat deposition between muscles.



- 90% conc. Diet →used to obtain growth rate →1.6 kg /d.
- 70% conc. Diet → used to obtain growth rate → 1.3 -1.4 kg/ d.
- air dried feed (R&C) → (2%C:IR) →"3%b.w/d"

➢ **for native breed :**
- Growth rate→1kg/d.
- air dried feed→ 3% b.w/d
- R:C→ 35:65

Q. why young calves more preferable for fattening???

Due to:

1) Growth rate →high &rapid.
2) low feed conversion "high feed efficiency"
3) Most growth in lean muscle "flesh".
4) Fat deposition occur intra & inter cellular so it preferable at 150kg B.wt.
5) unit of gain "kg" in mature animal "adult"
6) Need more energy req than young animal.

Q. practical point's considered in fattening calves ??

1) Light &young animal are more preferable →rapid gain & feed utilization.
2) Rapid growth is more preferable than compensatory growth due to
   - Efficient feed utilization.
   - ↓↓maintenance req.
   - 200kgB.WT calves →1kg daily gain →450 kg at 250 day.
   - 200kg B.wt calves → 0.8 daily gain → 450 kg at 312 day so 60 days difference → consume more feed & need more maintenance.
3) Fattening begin at 150kg due to low feed consumption & ↑↑efficiency.

	Daily growth rate kg/d	FCR
Less than 1 year	1.1	7.5:1
1-2 year	1.27	8:1
2 years or↑	1.3	8:1

4) Avoid over fattening than as it not associated with more growth & associated with more problems as:-
   - Liver abscess.
   - Rumen acidosis.
   - Laminitis.
   - ↑Cost.
5) Don't challenge the market.
6) Use grain promoters to:-
   - Improve gain by 10%
   - Improve feed efficiency by 5%.

Q. Factors affecting growth rate ?

1) Initial body weight
2) Breed
3) Sex
4) Age

Q. Feeding systems for fattening ?

1) Forage system
2) Concentrate feeding system.

Q. Why youn gcalf is pieferable for fatting than mature Age ?

1) Young age has higher growth rate
2) Mast growth is lean muscle
3) Feed efficiency is high.
4) Energy requirement for each k.g gain is less than adult.
5) Depression of fat is intra & intercellular.

Q. Pratical points are considered in fattening 9?

1) Light & young calf is preferable due to=> rapid growth rate &efficient feed
2) Rapid growth is preferred than compensatory growth due to –>efficient feed utilization
3) Avoid over feeding than maximum requirement –>Ruminal acidosis, liver abscess
4) Fattening begin at kooky bwt due to=> low feed consumption &high feed efficiency
5) Use growth promotors which => improve again 10%&feed efficiency5%

Poultry

Q. cal / protein ratio [c:p ratio]

- **Calculated by dividing the number of (k. cal) of ME per kg diet by the percentage of protein.**

Ex

Poultry need 2860 ME (k.cal /kg) & 23 % protein. If we will

↑ Energy to 2970 so what the % of protein.

- Ca/ protein ratio = 2860 / 23 = 124.35

124.35→ 1

2970 →??

- Protein = 2970 / 124.35 = 23.88 %

Q. Minerals & vitamins requirement for Poultry???

❖ Minerals requirement

- The approximately 13 inorganic elements required by poultry & perform a wide range of functions.
- Ca& p → major structural element of **bone** & **ca** is the major mineral of **egg shell.**
- Na , k , cl → have physiological functions in **acid base balance , fluid balance , membrane transport**
- The remaining minerals are cofactors in wide variety of enzymatic reactions
- The balance among selected minerals is an important consideration in poultry nutrition
  - e.g. → high ca diets **increase** the requirement of growing poultry for growing poultry.
  - **Ca** to **p** ratio of (1:1) to (2:1) is acceptable for growing poultry
  - Very high ratio (10:1) used in lying hens feed because of high ca required for egg shell formation.

❖ sources of minerals:-

- limestone → source of **ca**
- sodium dibasic phosphate → source of **ca & p**
- phytate → major source of **P** in plant & poorly available.

❖ vitamins requirement :-

- **Vit. C**
  - Synthesized by poultry.
  - Has favorable response to bird under stress.
- **vit. E**
  - ↑ When diet contain high level of polyunsaturated fatty acid which tend to undergo rancidity.
  - Some vitamins can be synthesized by the bird **But** usually **Not** in sufficient quantity to meet physiological demand of young growing poultry or laying hens.

Q: nutrient requirement & feeding of roiler chicken ??

1) Nutrient requirement for chicken broilers :-

nutrient	Shorter broiler (0-2 weeks)	Grower broiler (2-4 weeks)	Finisher broiler (4-6 weeks)
Protein %	23	20	18
ME(k.cal/kg)	3200	3200	3200
Ca%	1.0	0.9	0.8
P% (available)	0.45	0.4	0.4

2) Feeding → (protein , energy , mineral , vit req. of poultry مع الشرح)

Protein requirement for poultry

- Poultry is monogastric animal.
- Poultry need good quality protein rich in essential A.A.
- Protein essential a.a which are the same as required by mammals are :-
  - Arginine, phenylalanine, methionine
  - Threonine, tryptophan, valine
  - Histidine, leucine, isoleucine, lysine
- Other a.a considered essential in case of poultry nutrition are: - glycine , serine & praline
  - **Glycine & serine are metabolically interconventble**
    - The requirement of these a.a satisfied by both **Or**
    - Either one alone if provided in diet in sufficient quantity to allow for the synthesis of the other

❖ **Praline :-**

1- Important in growth rate.

2- Efficiency of feed utilization (good. feed. U.)

Sources of protein:-

1) Soybean meal (SBM)

- Major plant protein supplement.
- Rich lysine But deficient in methionine.

2) Corn gluten meal

- Plant protein source
- Not in poultry diet than 6%
- Has low palatability & deficiency in lysine, tryptophan

3) Fish meal

- More common Used in poultry feeding as it has all essential a.a.

NB

1- Methionine is the 1st limiting a.a in corn soy diets for poultry.

2- Synthetic methionine is widely used as supplement.

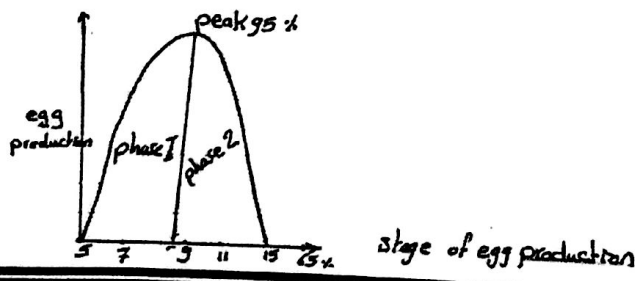
3- Synthetic lysine is widely used in poultry nutrition.

Border deficiency of protein	Severe protein deficiency
1) poor growth 2) reduce egg size & poor egg production 3) poor feed conversion into egg & meat 4) lack of melanin pigment → black or reddish color feather with low lysine	1) Stop feed intake 2) Stop egg production 3) Loss of body weight 4) Stasis of digestive tract & death

Q. Nutrient req. for laying hens ???

The chicken start to lay egg at 5 months during one year a en lay about 28 egg.

Growing & rearing 1-6 months | Egg production | 15 months



Nutrient req. for laying hens

	Starting chicks (0-6 weeks)	Growing chicks (6-12 wks)	Holding period (12-22 wks)	Laying or breeding hens (↑22wks)
Protein % (minimum)	21	16	14	17
ME (k.cal/kg)	3000	3000	2850	3000
Ca%	1.0	0.8	0.8	3.5
P% available	0.45	0.4	0.4	0.4
Na%	0.15	0.15	0.15	0.15
Chloride %	0.15	0.15	0.15	0.15
K%	0.4	0.4	0.4	0.4

Q. Nutritional factors affect external and internal quality ???

(1) External egg quality:

a) Egg size:

- Influenced by: - genetics, age, stage of sexual maturity and some dietary nutrition.
- The most important nutrition factors that affect egg weight are protein, a.a, linoleic acid, adequacy of diet and gossypol.

1) **level of protein and a.a in diet :-**
   - Protein has an immediate effect on egg weight
   - The higher the protein intake gives heavier eggs with respect of a.a.
   - Approximately 1% additional large egg may be expected for every 1% ↑ in CP content of the diet up to maximum of 20%
2) **Level of linoleic acid :-**
   - Linoleic acid → one of the factors leading to higher egg weight.
3) **Gossypol :-**
   - At high level gossypol → stop and ↓ egg size.

(2) Internal egg quality:

a) Yolk color:

- The color of egg yolk depends on the presence of carotenoid pigment known as xanthophylls in the ration.
- The pigments are found in fresh and good quality yellow corn.
- The pigment can be added as ration additives.
- C.S.M may result in production of olive green to dark brown yolks due to presence of gossypol.

b) Blood spots:

- Vit A deficiency is the major cause.
- Vit A required to minimize blood spotting & required for

b) Egg shell quality

- The major concern with egg shell quality involve shell thickness and shell stress

1) **Ca :-**
   - Since the egg shell is almost 100% Ca carbonate, the major nutrient factor involved in good shell is Ca.
   - Excessive levels of dietry Ca may cause localized Ca deposition in the egg shell.
2) **Vit D :-**
   - Adequate level of Vit D necessary for Ca absorption, subsequent proper shell.
3) **Phosphorus :-**
   - Excess P cause thin or weak egg shell

maximum egg production.

c) Egg white:

- Cotton seed oil cause pink discoloration of egg white → due to effect of malVlic α sterculic acids which are "fatty acids present in cotton seed oil".
- Normal egg albumin has a slight yellow green color which comes from riboflavin normally present
- ↑ Riboflavin cause objectionable albumin.

Q.Protein , energy in Turkey, ducks , Geese , Japanese quail, ostriches???

	Starting Turkey (0 – 8 Weeks)	Growing Turkey (8 – 16 Weeks)	Growing Turke period(16 – 24 Weeks)	Breeding & laying turkey
Protein %	28	22	16	14
ME (KCal/Kg	2800	3000	3100	2850

	Starting & growing ducks (0 – 7 Weeks)	Breeding ducks
Protein %	16	15
ME (K Cal/Kg)	2900	2900
	Starting α growing Japanese quail	Laying Japanese quail
Protein %	24	20
ME (K Cal/Kg)	2900	2900

	Starter (0 – 9 Weeks) ostriches	Grower (9 – 42 Weeks)	Finisher (42 W to mK weight)
Protein %	22	19	16
ME (K Cal/Kg)	2465	2450	2300
	(0 – 4Weeks)Geese	After 4 Weeks	Breeding
Protein %	20	15	15
ME (KCal/Kg)	2900	3000	2900

Q. Vitamins &mineral deficiency in poultry (disorders)???امتحان

Q. Mention nutrition disorders that cause leg problems???امتحان

(1) ↓↓ Ca, ↓↓ P ⟹ Rickets.
(2) ↓↓ (Mn, Folic acid, choline, Biotin) ⟹ Perosis
(3) ↓↓ Riboflavin ⟹ curled toe paralysis

Q. Nutrition disorder that cause Nerve problems???امتحان

↓↓ Thiamine ⟹ polyneuritis

Q.Nutrition disorder that cause Anemia???امتحان

↓ Fe ➔ Hypochromic microcytic anemia
↓ Cu ➔ Hypochromic microcytic anemia
↓ Vit E ➔ microcytic anemia
↓ Vit B12
↓ Folic acid

Q.Interaction between AA in poultry diet?2012

- A.A antagonism ⟹ one AA when increased in diet increase requirement of one AA as lysine & Arginine
- A.A imbalance => level of amino acid level in diet will increase requirement of other A.A.

Q.Feed additives added to broiler diet 9?2009,2010,2011

1) Antioxidant TO help stability of vitamins & unsaturated. A.
2) Antibiotic to suppress growth of undesirable microflora => act as growth promoters
3) Anti coccidial
4) Anti fungal agent
5) Enzymes as=> cellulose, hemicelluloses & phytase

Q.Poultry nutritional is more critical than other A due to "8"

6) Digestion is more rapid.
7) They are active
8) Their respiration& circulation is more faster.
9) They are more sensitive to environment
10) They become mature at earlier age
11) Bady temp.is=>4-5c` higher (41c`)

Q.Energy nutrient retlationship?2007,2012

- Feed in take is determined by bird need for energy so when you want to determine feed intake we must determine:-
    - Energy content in diet
    - Energy requirement of birds
- E.g:- In layers hens :- ME requirement 1 day 300 k.cal , ME content in dient 3000 k.cal/kg :- Amount of feed intake =300/3000 = 0.1 k.g

Q.Relation ship to lysine&Methionine? 2007,2012

- ↑↑Energy density of diet =>↓↓feed in take so => we must↑↑ lysine & Methionine in diet
- ↓↓Energy density of diet =>↑↑ feed intake so => we must↓↓ lysine & Methionine in diet.

POULTRY

Economic importance

About 55-70% of total production cost of poultry is from feed

Characters of poultry feeding:-

→digestion is more rapid

→respiration & circulation →faster

→grow at more rapid rate

→they mature at an earlier

→their body temp is 4 -5 c higher (41° c)

→more sensitive to environment influences

→more effective

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NUTRIENT REQ . OF POULTRY

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Energy requirement:-

??

→expressed in "K cal"

→poultry as most animals but they are feed for "cal"

→if energy is high in nutrient →we must increase other nutrient →to make balance

→low conc. of energy →eat more concentrate

→Ex:- bird fed diet containing 2600 k cal /ME /kg

→eat 30% more than bird fed diet contain 3200 k cal /ME /kg

Source of energy:-

(1)CHO	(2)Fat
→most important source of energy →CHO present in the grain as corn ,wheat, barley →50 -70 % →yellow corn Wheat bran →11-15 %→layer 5%→broiler Corn →excellent source of energy →↑vit A precursor & linoleic acid →good source of xanthophyl pigment →contain 3350 Kcal/ME/kg Wheat →good source of energy but lower than corn. →low in xanthophyl pigment →contain 3120 k cal/ME /kg Barely → Low in energy than corn but it is higher in fiber. → contain 2550 K cal/ME/kg.	→concentrate source of energy →produce energy 2.25 time more than energy produced from CHO →carrier of fat soluble Vit →addition of fat be feed→reduce dustiness →source of essential fatty acid as linoleic & linoleic acid →fatty acid composition of meet &egg affected by F.A composition of diet so→it is possible to enrich poultry product with omega as fish oil or linseed oil →desirable amount →3-6% →we shouldn't ↑amount of fat to avoid→rancidity

Factors affect energy requirement of:-

(1) Bread & strain

Development of breed &strain for specific purpose has a result in →genetic difference in the efficiency of energy utilization.

(2)Activity

→↑activity→↑energy requirement

→bird that have access to large area have →higher metabolic rate than that present in small cages

(3) Ambient temperature

→in cold temperature→↑energy requirement

→poultry sensitive to environment temp especially hot weather.

(4)Pentoses

→absorption rate is difficult, it is not much in grain but rich in leguminous seed so→it's ME is low (2250-2500 kcal)

Sheep

Q. Nutrient Requirement depends on??? يتكتب فى إجابة اى سؤال يخص "sheep"

- Size (weight)
- Age
- Stage and level of production
- Climate and environment
- Body condition

1) Size (weight):

- Nutrients requirement for different mature size ewe in late gestation, carrying twin lambs.
  - ↑ Body weight → ↑ energy requirement.
  - ↑ Body weight → ↑ DM intake (DMI)
  - ↑ Body weight → ↑ Protein requirement.

2) Age:

- ↓ age → ↑ energy requirement
- ↓ age → ↑ protein requirement.
- ↓ age → ↑ Ca, but ↓ P

(3) Level of production:

- **Protein:** maintenance < early gestation < late gestation < lactation.
- **DM:** maintenance < early gestation < late gestation < lactation.
- **Energy:** maintenance < early gestation < late gestation < lactation.
- **Ca, P:** maintenance < early gestation < late gestation < lactation.

(4) Number of fetus:

- ↑ No of fetus → ↑ energy and protein requirement.
- For (protein, energy, Ca, P) → single < twins < triple.

(5) Climate and environment:

- Wind and humidity with low temperature → ↑ body heat loss, and ↑ energy requirement live stock.
- Sheep's critical temperature depends on the length of its fleece and its feeding program.

Q. Energy Requirement of Sheep??

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	Maintenance	Pregnancy			Location
		1st third	2nd third	3rd third	
TDN%	50	55	50 - 52	58	62

Lack of energy is common in sheep:

- Low DM content of lush grasses.
- Over grazing of pasture → lake of feed or feeding low quality roughage.
- Sheep walk for long distance to obtain adequate feeds.

Factors affecting energy requirement for sheep

"شرح كامل" نفس العوامل الموجودة في الأبقار

1. Stage & rate of growth & breed → larger breed grow more rapidly → high energy requirement.
2. Reproductive stage.
3. Number of births.
4. Stress and environment.

Energy Sources:

- Mostly from forage, pasture, hay & silage.
- Grains (corn, barley, wheat, oats)

Sources:

1- High:	2-Moderate:	3- Low
▪ Cereal grain (79 – 88 %) (Corn , barley , wheat , oats) ▪ By product feed (76 – 90 %).	▪ Corn silage ▪ Good quality pasture ▪ Good quality hay	▪ Straw (40 – 48%) ▪ Low quality pasture ▪ Low quality hay

Symptoms of energy deficiency:

1. Slow & cessation of growth, loss of weight
2. Lowered milk production & shorten lactation period.
3. Reduced quantity & quality of wool
4. Reduced fertility or reproductive failure.
5. Lower resistance to infection & increase mortality.

Q. Protein Requirement of Sheep:

Protein requirement:

Stage	Maintenance	Gestation	Growth		Location
Cp%	8	9 - 10	Low	High	
			10 - 12	12 - 14	12 – 14

- Sheep need protein for wool growth, rich in SAA (cystine & methionine) which are derived from rumen synthesis in presence of sulfur.

Source of Protein:

- Green pasture & Legume hay "excellent source of protein"
- Protein supplements (SBM, CSM and Sun flower) especially for flushing, lactation, sucking & finishing lambs.
- Lactation ewe & early growing lamb → need protein by pass (hay - CSM) as microbial protein is insufficient.
- NPNC can be used with its production especially in high energy.

1)Highest source:	2)Moderate:	3) Low:	4)Lowest:
▪ Protein meals (46 – 52%) --- { SBM, CSM, Peanut meal } ▪ Urea (NPN) 2.88%	▪ Legume hay (13 – 21 %)	▪ Grass hay (10 -12 %) ▪ Cereal grain (8 – 14 %)	▪ Poor quality hay (<10%) ▪ Straw (3 – 5 %)

Factors affecting protein requirement of sheep:

1. Age, growth stage and rate
2. Pregnancy, lactation, body condition.
3. Protein energy ratio 35 -40 in production

N.B: Rumen developed some degree by 2 w and full development at 6 – 8 week due to bacterial protein synthesis.

Symptoms of protein deficiency:

1. ↓ Appetite → ↓ feed intake → ↓ feed efficiency.
2. cessation of growth, loss of weight
3. ↓ Milk production & shorten lactation period.
4. ↓ Quantity & quality of wool
5. ↓ Fertility or reproductive failure
6. Lower resistance to infection & ↑ morality
7. In sever condition → edema α anemia

❖ White muscle disease "Shiff lamb disease"

- Deficiency of Se and or vit E
- New born lamb, kid
- Sudden exercise may trigger condition

➢ Risk factor:

- Decrease Se or Vit E

➢ Symptoms:

✓ **Skeletal :– treat with vit E / Se**

1. Mild stiffness to obvious pain upon walking to inability to stand
2. Stiff gait
3. Hunched up appearance منحنيه

✓ **Cardiac:-**

4. Fever
5. Frothy nasal discharge
6. Difficult breathing
7. Pneumonia
8. Irregular and elevated heart rate

➢ Prevention:

- Provide adequate Se and Vit E in diet
- Se / Vit E injection "be careful"

Q. feeding of ewes ???? هام

a) Maintenance of ewes:-

- Maintenance diet (80 -40%) of the year (4 -5 months) except:
  1) 35 days of breeding season (flushing)
  2) 60_70 days of early pregnancy
  3) 120 days of lactation period (nursing lambs)
  4) Early weaning ↑ period of maintenance

b) Flushing of ewes:-

- Flushing is improving nutritional status just before & during breeding season (3- 4 wks) to:-
  1) Improve body condition
  2) Stimulate ovulation
  3) Improve conception rate

- Flushing is not practical for all ewes
  - Length of flushing period depend on body condition score
  - Body condition score at 2 or low → depress ovulation → not respond to flushing
  - Body condition score at 2.5 (48 -50kg) → good respond to flushing
  - Body condition score at 3 _ 3.5 → not respond to flushing
  - Body condition score greater than 3.5 → negative respond to flushing
  - ✓ Flushing is done by giving 0.5_ 1 Lb grain / hr in addition to grazing in pasture

c) Pregnancy:-

1) Feeding ewes during early pregnancy (1 – 40 days):

- Critical period is from conception until complete of implantation at **40 days** → embryo is completely dependent **on placental fluid** for nourishment
- Nutrient needed → ↑ slightly than maintenance
- Severe under-nutrition or stress → deplete these fluid either in volume or in content of essential nutrient → causing death of embryo

2) Feeding ewes during mid-pregnancy (40 – 100 days):-

- Pregnancy ewes should maintained normal body weight at this period
- Maintenance diet satisfy requirements
- Extreme deviation from maintenance req. → fetal death
- Extreme than req. → fat deposition that cause problems later in pregnancy (pregnancy toxemia & dystocia)

3) Feeding ewes during late-pregnancy (110 – 150 days):-

- 2/3 of fetal growth occur at the last 6 wks of gestation
- Ewes should enter this period with body score of 3_ 3.5 & gained 10 _ 15% of normal body weight (single fetus) & 20% (twins)
- Both protein & energy levels of diet are important
- Feeding adequate good legume hay mostly in addition to some grains for energy needs in cases of multiple fetuses
- Inadequate nutrition → affect fetal growth & birth weight & reduction milk production
- Over-nutrition during late pregnancy causing fatness & dystocia

- Pregnancy toxemia most occur in fatter ewes carrying multiple fetuses → leading to ↑ feed intake
- Pregnancy toxemia is due to shortage of food energy , if energy comes from body fat → Pregnancy toxemia occur
- Addition grains (energy donor) supplied for ewes with multiple fetuses to avoid drainage up from body fate
- Its best to group of ewe flocks to 3 groups acc. To body condition & feed
  1) Thin & younger ewes → 2.5
  2) Good ewes → 3_ 3.5
  3) Fattened & over-fattened ewes → over 3.5

d) Milk production :-

- Majority of the worlds production system → nursing of lambs
- **Factor affecting level of milk production :-**
  1) Genetic makeup
  2) No. of lambs that are sucking
     - Ewes nurse twins produce 30_ 50% more than that nurse single
     - Ewes suckling triples produce more milk than those of tins
  3) Nutritional status during mid & late pregnancy & after parturition
     - Protein & energy are most critical nutrients to support milk
     - Good pasture or barseem meet protein need of high production ewe while supplemented energy (grain) is needed to maintain milk production at high level on pasture

Q. Feeding newly born lamb from birth till weaning ??? 2007,12,13

1) Colostrum is rich in protein, fat, minerals, vit. & immunoglobines at least 50 _ 100 ml colostrums / day of fresh colostrums of ewe or cow for 2_3 days
2) First 2_3 wks after colostrums ,the lamb take only ordinary milk ,first month → **45_50 %** of total milk production ,2nd month → **75 %** of total milk production,3rd month → **35 %** of total milk production , 4th month → **20%** of total milk production

- **Amount of milk differ acc. To no. of litter:-**
  a) Single → 125 ml / day
  b) Twins → 170 ml / day

c) Triple → 190 ml / day
   - food conversion rate 5:1

3) Feeding concentrate start 3_4 wks old , give whole grains 2 weeks to 2 months + water
4) At beginning of 3rd wks, give lamb good quality chopped hay to stimulate rumen

Weaning age:-

- At 5_6 wks of age
- Body weight → 3 time of birth weight (3_9kg)
- Animal can eat 300 g DM/ day
- At weaning allow suckling for 10_20 min / day for 24_48_73 hrs to avoid mastitis

Q.Feeding of weaned lamb ???

- Early weaning is separate lamb from ewe 61 day & fed on posture + conc. For rapid fattening & slaughter at 6_7 months & body weight is 38kg
- Diet for weaned lambs :-
  - Corn →61%
  - SBM →25
  - Chopped hay → 8
  - Molasses → 4
  - Premix → 0.5
- Lamb can grow & finished on:-
  - High quality posture system
  - Posture plus supplement system
  - Dry late feeding system
  - & this depend on desired making time & type of lamb to be solid & available feed resources
- Posture of wheat & barely & alfa alfa & clover can provide nutrient for growth
- If lamb grazing on low quality posture ... need addition energy (whole or ground grains)

rabbits

Q. Advantage of rabbit breeding??

1. Rapid growth rate

- Rabbits reach market size (2 – 2.25 Kg) at 8 – 12 weeks of age.
- Cold area ----> 40 – 50 g/d -----> market weight at 8 – 10 W
- Tropical area ----> 20 -30 g/d -----> market weight at 10 -12 W

2. High reproduction potential

- Reach sexual maturity in about 4 months from birth.
- Induced ovulation (spontaneous ovulation) ---> ovulation occurs 12 h postmating.
- The gestation period is 31 days.
- Wild rabbit ---> does can rebreed within 24 h of kindling ---> 11 litters / year.
- Domestic rabbit's normal rebreeding schedules are 7, 14, or 21 days post kindling acc. to weaning age (28 to 42 days) & No of litters ---> 5 – 9 kindling /year

3. Non-competitive to human feed

- Rabbits depending on roughage & milling by-products as wheat bran, rice bran, SBM, etc.

4. Small body size

- Need small amount of forage & feed than other animals.
- Easily handling, cleaning & management.
- Not need specific housing.
- Not cause noise.
- Economic to be slaughtered for a family.

5. Produce meat of a low fat content

- Rabbit's meat is white meat & low in fat content ---> used for sick human – easily digestible.

Q. Cecotrophy??

- **Def:-** is a physiological state occurs in domestic rabbit at night about once or twice every 24h at which rabbit eat soft feces anal opening directly.
  - The rabbit is a small non-ruminant herbivorous (perform with cecotrophy) with (cecum is the major site of microbial growth and fermentation)
  - The rabbit have ability to make selection for separation of fiber particles (rapid excretion) from more digestible non-fiber components (as starch) ---> for fermentation in the cecum.
  - The selective separation and excretion of fiber is made by muscular activity of proximal colon then moved rapidly by peristaltic movement to colon to forming hard feces (37% water, 30% fiber, 14% protein)
  - Reverse peristalsis moves the nonfiber components (starch granules, proteins, and fluids) from the proximal colon to the cecum ---> microbial fermentation.

- About once every 24 h, colon is completely emptied of hard feces ---> soft feces (cecotropes) are excreted (cecum) contract to move the cecal contents ---> proximal colon in which mucus is secreted from goblet cells ---> forming mucus-covered cecotrpes (soft feces) 47% water, 15% fiber, 30% CP ---> peristaltic ---> colon ---> consumed directly from the anus (cecotrophy) ---> protected from stomach acid (stay for 3 -6) by mucus coating ---> digested in small intestine ---> provide energy (from VFA) represent 40% of maintenance E and B-complex vitamins & microbial protein
- Experimental prevention of cecotrophy ---> reduced digestibility of all nutrient fraction. Thus the digestive strategy of the rabbit is to consume forage-based diet, separate out and rapidly excrete most of the fiber, and ferment nonfiber components in the cecum.
- The nutritional effectiveness of cecal fermentation is enhanced by the animal's consumption of the cecal contents by cecotrophy. This explains why the digestibility of fiber in rabbit is very low, although its natural diet is high in fiber.

Dietary protein & AA requirements

- 13% for maintenance
- 15% for growing

- **VFA from cecal fermentation** ---> **12 to 40%** of maint. ---> propionic acid is a minor VFA (differ from ruminants); **acetate and butyrate** are the major VFA (due to unique **microbial population** of the hind gut; dominated by Bacteriodes spp. Of bacteria)
- **Fat---> 3%** is recommended in rabbit diets as vegetables oils.هام

  - UFAs ---> glossiness of fur ---> for slow
  - Improves diet palatability
  - Increase energy level without carb. overload of the gut

- **Inadequate energy intake**هام ---> body condition declines and impairs reproductive performance.

Excessive energy intakeهام ---> increase fat deposition --->reduce reproductive performance & small litter size and a high mortality rate of kits at birth may occur due to increased fetal size and accumulation of fat deposit in abdominal cavity of doe ---> dystocia with death of fetuses during birth

Sources of Energy: -هام جدا

- **Cereal grains**: prefer barley, oat, then yellow corn and wheat bran?? As yellow corn is low digestible in small intestine so increase amount of starch go to cecum ... increase fermentation and increase volatile fatty acids ... change microbial population ... stimulate pathogenic microorganisms.
- **Fat: 3-5%** it characterized by ... affect CF in diet, source of energy, source of essential fatty acids, improves wool appearance.
- **VFA:** are products form CF fermentation in cecum gives 12-40% of E for maintenance.

Dietary crude fiber:-

- Indigestible fiber has a physical effect on gut mucosa, maintaining normal gut motility.
- For optimal growth and gut function ---> 12 to 16% dietary CF.
- **Maintenance: **15-16%**
- Growing: 14%
- Lactation: **12%**

- 15-16% for gestation
- 18% for lactation

Cecotrophy & protein requirements and quality هام:-

- Rabbits have a much better ability to digest and utilize the protein in forages as berseem meal. The ability to digest forage proteins due to retention of nonfiber components in the cecum where fermentation & cecotrophy.
- Experimentally preventing cecotrophy markedly reduces the digestibility of forage protein in rabbits.
- A mount of cecotropes consumed reflects dietary protein status
  - On high-protein diets ---> cecotropes are not consumed
  - On low-protein diets ---> cecotropes are highly consumed
- Excess dietary protein isn't desirable ---> affects air quality.
- **Excess protein and AA** is excreted in the urine as urea (increase water excretion) ---> bacterial action in manure ---> ammonia which negatively affects air quality.
- Rabbits are raised in confined buildings +high stocking density +high water requirements ---> excrete large amount of urine ---> high humidity ---> with high atmospheric ammonia is rabbit building ---> damages the cilia and mm in the nasal passages ---> P, multocida ---> snuffles (sneezing, nasal discharge, fever ... high mortality) ... acute form but chronic form ... multiabscesses under skin

Energy هام

- **DE ----> low fat content of rabbit meat reflects the low DE req. rabbit ---->2200 – 2800 Kcal/kg diet**
- Maintenance: 2200
- Growing: 2500
- Gestation: 2500
- Lactation: 2700 – 2800
- **Higher DE-diet (low CF content especially indigestible fiber)** ---> unsuitable for rabbit production ---> hypomotility (constipation) disturbance in cecal microbe populations ---> reduced feed intake, impair rabbit performance & increase incidence of enteritis.

Q. Nutrient Requirements???

1- Energy Req.

1. **needed lower than energy required for other animals due to:**
   - Fish is cold blooded → so not expand Energy to maintain body temperature.
   - Exert less Energy in movement in water.
   - exert less ammonia (as a result of protein catabolism) rather than complex (urea, uric acid)

2. Factors affecting:
   - Water temperature → any deviation than (standard environmental temp) , ↑nutrient required.
   - Physiological changes → ↑ activity crowding → ↑ Energy required.
   - Stress → as ↓O2, ↑ammonia, crowding -→ ↑ Energy required.
   - Body size → inverse relationship → small fish need Energy required at high La

3. Source of Energy
   CHo not major source of energy, so depend on fat & protein.
   a. CHo:
      - Primary source of CHo is concentrate → cereal grains, wheat by product
      - Low in energy efficiency than land animal.
      - CHo digestibility in warm water fish (Tilapia) 70% of gross energy of uncooked starch while in cold water fish (trout) ↓50% so should heat treated to uncooked starch to ↑ its digestibility.
      - Fish need CF (3 – 8 %) → from B. hay but not more 8% (↓feed intake)

   b. Fat:
      - Major source of energy , palatable, supply essential F.A (as linoleic acid), help in absorption of fat soluble vits.
      - If ↑fat amount → Energy, protein ratio imbalance.
      - Deficiency of essential F.A → retard growth, ↑ mortality, abnormality

2- Protein Requirement

- Need 62 - 70% protein so if ↓ in one or more a.a inactivity, ↓ appetite , ↓ wt.
- Source: fish meal, SBM, CSM, corn-gluten, Poultry by product.

- Gestation: 14%
- **Low-fiber diets ---> fur chewing (an attempt to increase CF intake) ---> formation of hairballs in the stomach ---> gut blockage ---> affected animals go off feed and starve to death ---> increase mortality.
- Feeding hay or straw help to overcome a fur-chewing.
- **High-fiber diets --->decrease nutrient intake ---> decrease performance.

Fiber

- **Indigestible fiber** help in prevention of enteritis by stimulating gut motility, and also because diets high in fiber sources such as berseem meal are usually low in fermentable carbohydrate.
- The particle size of fiber is important; finely ground berseem, is not an effective source of dietary fiber for preventing enteritis.
- **Low lignin fiber sources (poorly digested) as beet pulp and wheat milling byproducts ---> not effective in preventing enteritis.
- **Highly lignified fiber sources (poorly digested) as straw are most effective in stimulating hind gut motility through physical effects on gut lining ---> prevent enteritis.

Fish Nutrition

Q. Difference between feeding fish & land animals?

1. En- requirements is lower than land animals.
2. can absorb minerals from surrounding water (Ca, Mg, P, K) so ↓need of these mineral in diet.
3. need certain F.A (POmega3 F.A) that some land animals don't need.
4. Some fish have limited ability to synthesize vit C (so it depend on diet)
5. fish food have specific physical properties:
   - particle size must be suitable for spp. (Fry, fingelings 20-30 g, adult)
   - food may be float or sink (not disintegrate)
   - nutrient should be stable
   - food should be minimum, food wastage (not affect dissolved O2)

- Factors affects → temp (cold water or hot water fishes)
  → size fry > fingerlings > adult
  →Spp.

3- Mineral Requirement

- Fish can absorb some minerals from surrounding
- Ca: (0.45 – 0.7%) so add limestone as source of Ca.
- P: (0.5 – 0.8%) deficiency → poor growth, bone deformity.
- Mg: (0.04 - 0.06%) deficiency → poor growth, Anorexia
- Na, Cl, K: are sufficient in sea water, in commercial diet (0.5% NaCl)
- Iron: low in water so depend on diet.
- Zn: (15 – 30 mg/Kg) if 0.8 – 1mg (lead to mortality)

4- Vitamin

- Vit A deficiency → poor growth , Exopthalmia
- Vit D deficiency → impaired homeostasis of Ca, P
- Vit E deficiency → Nutritional muscular dystrophy

Q.Systems of fish culture???

1. Extensive fish culture (natural feed):

- Fish obtain their food from plankton (zoo or phyto) not artificial feeds
- Ponds are fertilized so propagation of plant & organism (proto, algea)
- Advantage(Not expensive), disadvantage (low yield, feed is unavailable)

2. Semi-Intensive fish culture:

- Fish obtain supplementary feeding so (natural + supplement) ↑ protein 28%
- Aim: ↑yield & taking all advantage of natural feed

3. Intensive fish culture:

- Fish obtain nutritional formulated complete feeds (to obtain rapid growth)
- Aim: 1. Maximum yield per unit. 2. Useful when market value of fish

Q.Feeding of Tilapia???

DE. Kcal/Kg 3000 **Cp% 32**

- Not need high level of protein in supplement as natural pond are rich in protein.
- Fish fed 28% Cp in semi-intensive pond & 30 -36 % Cp in intensive pond.

Q.Feeding rates of tilapia are affected by?

- Species as tilapia rendali consume more than niloticus of some age
- Size: the smaller size consume more than the larger one

Q.Water quality, energy in deit & feeding frequency?

Feeding frequency:

- Deficiency: No of feeding in day
- Ex: Tilapia benefit from daily feeding.
- Tilapia niloticus grow faster when fed four times daily than when fed two times but did not grow faster when fed eight times.
- The feeding frequency decreased as the fish increase in size.

e.g: 0.10 g of fish → fed 30 – 10% of B.wt & need 8 freuency.

1.5 g → 10 – 6% of Bwt → 6 freq

5 - 20 g → 6 - 4% of Bwt → 4 freq

20 - 100 g → 4 – 3% of Bwt → 3-4 freq

> 100 g → 3 – 2% of Bwt → 2-3 freq

④ changing from high roughage diet to ↑ Conc.

⑤ feeding ↑ fermented feed (corn silage)

as → Na bicarbonate, Ca Carbonate & K. Carbonate.

Q probiotics as feed Additives??

↳ Substance ∵ Contain desirable Q IT microbial Cultures & ion gradients that enhance growth of desirable GIT microbes (available in powder, granular or Liquid Form)

↳ Mode of Action:-

① Change in gut Microflora & ↓ E. Coli (pathogenic)

② produce Antibiotics & Adhesion to intestinal mucosa.

③ synthesis of Lactic acid → reduction in intestinal pH

④ prevention of toxin amine synthesis in gut

⑤ stimulate immune response in gut

⑥ secreting digestive enzyme (cellulase, xylenase)

⑦ Lacto-bacilli secreting lysine.

Feed Additives

Q Growth promoting agents as feed Additive??

* Anti-biotics → natural metabolites of fungi that inhibit growth of bacteria → used as growth promoting when fed at the sub-therapeutic does
  * used for ttt or prevention of diseases
  * as bacitracin, virginiamycin & flavomycin
  * Mode of Actions-
    1. important for suppressing mild & unrecognized infection
    2. improve synthesis of vit. & other growth factors
    3. ↓ production of microbial toxins ∵ depress growth
    4. withstand stress factors

Q Buffer as feed additives??

* lesser changes in pH by adding weak acids or alkaline to ruminants' ration → ↑ digestion & extensively recommended in
  1) feedlot cattle, lamb.
  2) feeding or reduced practicle size
  3) high producing cow that feed ↑ conc. diet (↓ saliva & ↓↓ intrinsic buffer capacity)

Q Feed additive used in feeding fish??

* growth H, thyroxine & sex hormones, Antibiotic
* Binders → gelatine, Molasses
* Coloring agents or flavoring agent

Nutrition problem in dogs-

- Feeding raw egg → Contain avidin ← Trypsin inhibitor so, it's should eat boiled egg.
- Feeding Milk ← dairy product → is excellent Feed excess lead to diarrhea ← gases
- raw fish → Must not be fed continously.
- excessive oil of Fat lead to → obesity ← pancreatitis
- ↑↑ P ← protein → in diet lead to urinary Calculi
- Flacuation Colic s → due to feeding dry feed Contain high level of carbohydrate ← cHo digestive enzymes is Low so cHo pass to hindgut ← undergo Fermentation
- Nutritional hyperparathyrodism.

2. Feeding Cat diet deficient of polyunsaturated fatty acid of A origin

Lead to →
- dry hair coat
- show wound healing
- dermatitis
- impair reproduction
- deficiency of Arachidonic Fatty acids lead to ↓↓ prostaglandin synthesis So → Can not convert ammonia into urea ⇒ hyperammonia

3. Feeding Cat of Low animal protein diet lead to → "2013" hyper ammonemia lead to neurological signs
- deficiency of Arginine lead to
- deficiency of A.A. taurine lead to →
  - degeneration of retina of eye
  - ↓ Myocardial failure
  - reproductive "
- deficiency of Niacin

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